

Municipal Road Inventory and Evaluation Interim Guidance

2016 Field Season

Legislative Requirements

Act 64, the Vermont Clean Water Act, requires the Vermont Department of Environmental Conservation (DEC) to develop a draft Municipal Roads General Permit (MRGP) to address road-related runoff impacting waterways. Towns will begin applying for coverage under the permit in summer of 2018 (proposed). As part of the development of the MRGP, new municipal road practice standards will be developed.

This interim road erosion inventory template is meant only as voluntary guidance (not required) as to how to conduct road erosion inventories during the pre-MRGP period (2016-2018). Towns are free to use any road erosion inventory methodology that they chose. This interim guidance is meant to assist municipalities in better preparing for the MRGP.

Identifying Erosion for Municipal Roads

Municipal road erosion is the breakdown of road surfaces or ditches due to the ineffective management of water.

Ways to Prepare for the Permit Now

DEC encourages towns to get ahead now and identify road segments where erosion is occurring that is affecting waters of the state (perennial or intermittent streams, lakes, ponds or wetlands). This guidance is voluntary and has been approved by DEC as a good interim step before the permit requirements are made final in 2017.

1. Review GIS road segment connectivity maps, made available for each municipality by DEC at anr.vermont.gov/maps/nr-atlas. The GIS road segment connectivity is determined by road segment proximity to waters of the state, both bisecting and lateral distance.
2. Verify each road segment given a *Road Erosion Risk Ranking Identification Number* in the field to confirm the potential to affect water quality. Additional road segments not included in the GIS road segment connectivity map may be found to affect water quality in the field.
3. For each segment that is verified in the field to potentially affect water quality, complete the corresponding *Road Inventory and Evaluation Form*.
 - a. Paved Roads with Open Ditches: Form A
 - b. Gravel/Open (Ditched) Non Class 4 Roads: Form B
 - c. Class 4 Roads: Form C
 - d. Paved Roads with Curbing Drainage and Catch Basins: Use a separate evaluation and reporting mechanism. Regular street sweeping, catch basin clean outs, and catch basin outlet erosion inventories and other considerations will be included

Interim Road Inventory and Evaluation Form A

PAVED ROADS WITH OPEN DITCHES

Measure erosion quantity, noting moderate and severe erosion.

1 Road Segment = 100 meters = 328 feet

Both sides of road = 200 meters = 656 feet

ROAD SEGMENT ID NUMBER(S):

ROAD DRAINAGE: Map where erosion is evident in the ditch

What percentage of the segment (**both sides of road, 200m, 656'**) is the drainage ditch **NOT** stabilized with vegetation ($\leq 5\%$ slope) or stone ($> 5\%$ slope) or **NOT** allowed to sheet flow to a vegetated or forested filter area?

0% - 25%

26% - 50%

51% - 75%

76% - 100%

DRAINAGE CULVERTS

SIZING: Map where drainage culverts are undersized, absent but needed, and/or where erosion is present due to culvert size

Total drainage culverts within segment:

Total drainage culverts that are LESS THAN 18":

END TREATMENTS: Map where drainage culvert end treatment is needed and/or where erosion is present

Total drainage culvert ends lacking appropriate stone or headwall treatment:

OUTLET STABILITY: Map where drainage culvert outlet stabilization is needed and/or where erosion is present

Total drainage culvert outlets lacking appropriate stone apron, splash pad, or equivalent stabilization:

CONVEYANCE ZONE/AREA: Map where drainage outlets/conveyance zone/areas are not turned out or stabilized with vegetation ($\leq 5\%$ slope) or stone ($> 5\%$ slope), and/or where erosion is present

Total # drainage outlets/conveyance zone/areas within segment:

Total # drainage outlets/conveyance zone/areas NOT turned out or stabilized:

DRIVEWAY CULVERTS

SIZING: Map where driveway culverts are undersized, absent but needed, and/or where erosion is evident due to culvert size

Total driveway culverts within segment:

Total driveway culverts that are LESS THAN 15":

END TREATMENTS: Map where driveway culvert end treatment is needed and/or where erosion is present

Total driveway culvert ends lacking appropriate stone or headwall treatment:

Linear feet of Rill Erosion (Moderate)	Linear feet of Gully Erosion (Severe)	Location of erosion within road cross section	Notes
		Travel lane	
		Embankment/shoulder	
		Drainage ditch	
		Ditch outlet/conveyance zone/turnout	
		Drainage culvert or water bar (presence/absence or size/quantity)	
		Drainage culvert outlet	
		Drainage culvert headwall	
		Stream and road conflict	
		Other area:	

Interim Road Inventory and Evaluation Form A

PAVED ROADS WITH OPEN DITCHES

Map erosion areas through sketch or GPS, noting moderate and severe erosion:

- ☐ Erosion in ditch
- ☐ Undersized or absent drainage or driveway culverts and/or erosion due to culvert size.
- ☐ Drainage or driveway culvert end treatment needed and/or erosion due to culvert end treatment.
- ☐ Culvert outlet stabilization needed and/or erosion due to culvert outlet stabilization.
- ☐ Gully erosion within the municipal ROW.
- ☐ Drainage outlets NOT turned out, stabilization needed, and/or erosion due to turnout.
- ☐ Erosion at the conveyance outlet to water resource.
- ☐ Stream bank causing roadway erosion in an area not already stabilized.
- ☐ OPTIONAL: Map locations where erosion is present within armored banks.



Interim Road Inventory and Evaluation Form B GRAVEL/OPEN (DITCHED) NON CLASS 4 ROADS

Measure erosion quantity, noting moderate and severe erosion.

1 Road Segment = 100 meters = 328 feet
Both sides of road = 200 meters = 656 feet

ROAD SEGMENT ID NUMBER(S):

ROADWAY CROWN: Map where erosion is evident within the travel lane/roadway

What percentage of the segment is **NOT** properly crowned (1/4"/ft.), in-sloped, or out-sloped?

0% - 25%

26% - 50%

51% - 75%

76% - 100%

GRADER BERM/WINDROW/HIGH SHOULDER: Map where erosion is forming a secondary ditch

What percentage of the segment (**both sides of road, 200m, 656'**) is the grader berm/windrow/high shoulder **NOT** removed?

0% - 25%

26% - 50%

51% - 75%

76% - 100%

ROAD DRAINAGE: Map where erosion is evident in the ditch

What percentage of the segment (**both sides of road, 200m, 656'**) is the drainage ditch **NOT** stabilized with vegetation ($\leq 5\%$ slope) or stone ($> 5\%$ slope) or **NOT** allowed to sheet flow to a vegetated or forested filter area?

0% - 25%

26% - 50%

51% - 75%

76% - 100%

DRAINAGE CULVERTS

SIZING: Map where drainage culverts are undersized, absent but needed, and/or where erosion is present due to culvert size

Total drainage culverts within segment:

Total drainage culverts that are LESS THAN 18":

END TREATMENTS: Map where drainage culvert end treatment is needed and/or where erosion is present

Total drainage culvert ends lacking appropriate stone or headwall treatment:

OUTLET STABILITY: Map where drainage culvert outlet stabilization is needed and/or where erosion is present

Total drainage culvert outlets lacking appropriate stone apron, splash pad, or equivalent stabilization:

CONVEYANCE ZONE/AREA: Map where drainage outlets/conveyance zone/areas are not turned out or stabilized with vegetation ($\leq 5\%$ slope) or stone ($> 5\%$ slope), and/or where erosion is present.

Total # drainage outlets/conveyance zone/areas within segment:

Total # drainage outlets/conveyance zone/areas NOT turned out or stabilized:

DRIVEWAY CULVERTS

SIZING: Map where driveway culverts are undersized, absent but needed, and/or where erosion is evident due to culvert size

Total driveway culverts within segment:

Total driveway culverts that are LESS THAN 15":

END TREATMENTS: Map where driveway culvert end treatment is needed and/or where erosion is present

Total driveway culvert ends lacking appropriate stone or headwall treatment:

Linear feet of Rill Erosion (Moderate)	Linear feet of Gully Erosion (Severe)	Location of erosion within road cross section	Notes
		Travel lane	
		Embankment/shoulder	
		Drainage ditch	
		Ditch outlet/conveyance zone/turnout	
		Drainage culvert or water bar (presence/absence or size/quantity)	
		Drainage culvert outlet	
		Drainage culvert headwall	
		Stream and road conflict	
		Other area:	

Interim Road Inventory and Evaluation Form B
GRAVEL/OPEN (DITCHED) NON CLASS 4 ROADS

Map erosion areas through sketch or GPS, noting moderate and severe erosion:

- ☐ Erosion in travel lane
- ☐ Erosion forming a secondary ditch
- ☐ Erosion in ditch
- ☐ Undersized or absent drainage or driveway culverts and/or erosion due to culvert size.
- ☐ Drainage or driveway culvert end treatment needed and/or erosion due to culvert end treatment.
- ☐ Culvert outlet stabilization needed and/or erosion due to culvert outlet stabilization.
- ☐ Gully erosion within the municipal ROW.
- ☐ Drainage outlets NOT turned out, stabilization needed, and/or erosion due to turnout.
- ☐ Erosion at the conveyance outlet to water resource.
- ☐ Stream bank causing roadway erosion in an area not already stabilized.
- ☐ OPTIONAL: Map locations where erosion is present within armored banks.



Interim Road Inventory and Evaluation Form C

CLASS 4 ROADS

Measure erosion quantity, noting moderate and severe erosion.

1 Road Segment = 100 meters = 328 feet

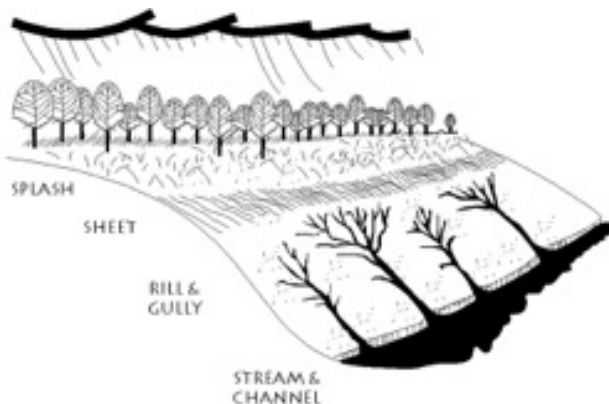
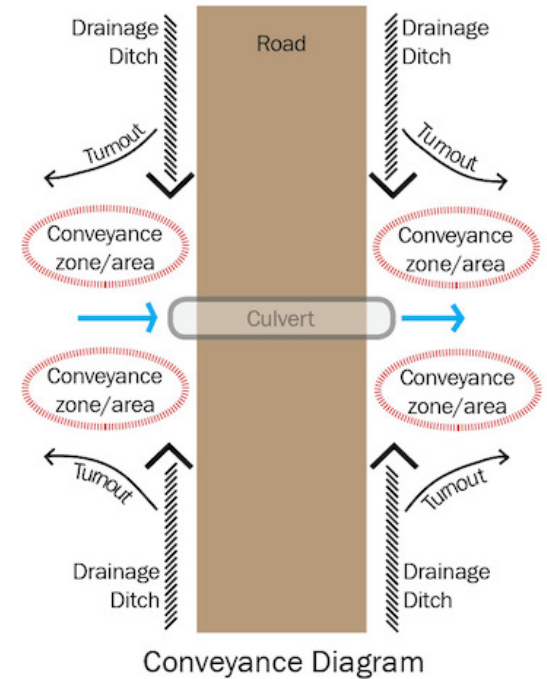
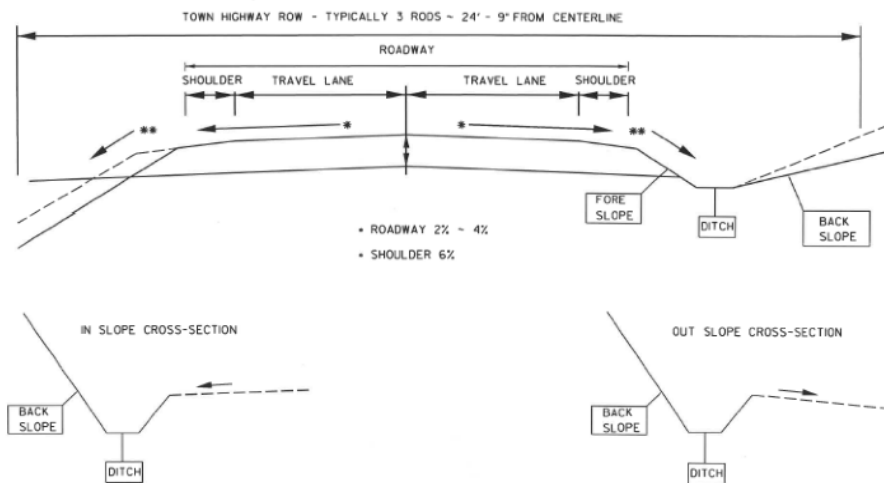
Both sides of road = 200 meters = 656 feet

ROAD SEGMENT ID NUMBER(S):

Linear feet of Rill Erosion (Moderate)	Linear feet of Gully Erosion (Severe)	Location of erosion within road cross section	Notes
		Travel lane	
		Embankment/shoulder	
		Drainage ditch	
		Ditch outlet/conveyance zone/turnout	
		Drainage culvert or water bar (presence/absence or size/quantity)	
		Drainage culvert outlet	
		Drainage culvert headwall	
		Stream and road conflict	
		Other area:	

Map erosion areas through sketch or GPS, noting moderate and severe erosion:

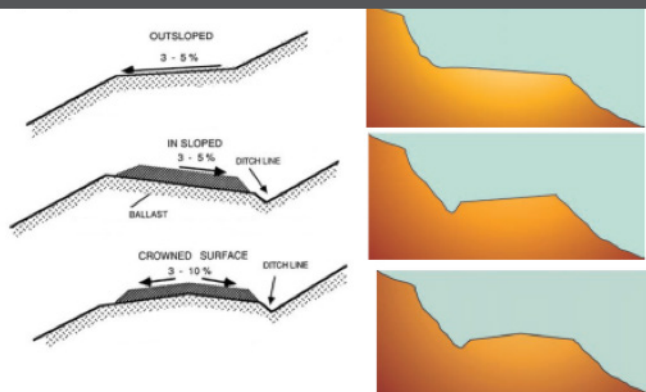
TOWN HIGHWAY TYPICAL



Erosion Severity



Stone-lined conveyance zone/area
(Jim Ryan)



Road Crowning and Sloping
(FAO, 1998)



Good road crown with processed road surface materials
(USDA Forest Service, 2012)



Severe gully erosion
(Beverley Wemple)



Rill erosion
(Beverley Wemple)



Rill erosion
(Beverley Wemple)

Culvert headwall needed
(Jim Ryan)



“Perched” culvert outlet gully erosion
(DEC and VTrans, 2015)

Significant grader berm, prohibiting perpendicular sheet flow
(Kevin Gadapee)



Road runoff flowing parallel down road
(USDA Forest Service, 2012)



Road embankment erosion, river-road conflict (Jim Ryan)



Road embankment erosion, river-road conflict
(DEC and VTrans, 2015)